REMARKS

Amendments to the Claims

The present amendment is submitted in an earnest effort to advance the case to issue without delay.

Claim 1 has been amended without prejudice to recite a preferred embodiment of applicants invention that is more clearly differentiated from the prior art. Specifically, the limitations recited in original claim 2 and previously presented claim 15 have been incorporated into claim 1. The preamble to the claim has also been modified to specify that the fruits are "characterized as having a surface and a core" (terms defined on page 7 line 32 to 8, line 2) so as to establish correct antecedent basis for the new limitations incorporated into the claim.

Claims 2 and 15 are hereby canceled without prejudice.

Claims Rejection under 35 USC §103

Claims 1-5 and 13-15 were rejected under 35 USC 103(a) as being unpatentable over Yamane et al (EP 0,815,746 A1) in view of Fellows (Food Processing Technology – Principles and Practice). Francis et al (Wiley Encyclopedia of Food Science and Technology) was cited as further evidence. Applicants traverse this rejection below.

Yamane et al is directed to the general problem of preserving foods at low temperature and restoring them to room temperature with a high degree of freshness.

The method of preservation disclosed by Yamane et al involves preserving perishable food in a non-frozen state by comparatively rapidly cooling from ordinary temperature to the vicinity of the freezing point of the food (generally less than 0° C - see Yamane page 6) then slowly cooling the food to below the freezing point (i.e., under-cooling) at a cooling rate of 0.01 ° C/hr – 0.5 ° C/hr. (Abstract)

Yamane et al disclose in Example 10 (page 13, lines 31-39) that this super slow cooling treatment can be combined with equilibration of the fruit for two weeks in the non-frozen state followed by further rapid cooling to below -18° C.

Yamane et al are silent about under-cooling fruits at a cooling rate greater than 0.5 ° C/hr, let alone greater than 2 ° C/hr.

Yamane et al are silent about the flavor and texture of frozen fruits eaten in the frozen state.

In contrast, applicants' invention is directed to the problem of the production of frozen fruits which when eaten frozen retain the strong and characteristic flavor of unfrozen fruits.

Applicants' have pointed out in the background to the invention (see page 1, line 25 to page 2, line 6) that not only is the use of "super-slow" cooling rates of 0.01 to 0.5° C/hr impractical on an industrial scale, but such rates actually produce fruits having a mild taste.

In contrast to Yamane et al, applicants' have discovered that an under-cooling rate between 2 C/hr and 320 C/hr can be employed (4 to 600 time higher than the

maximum rate according to Yamane et al) provided that the cooling rate is chosen such that the temperature difference between the surface and the core of fruit is less than 1.5° C and that the median fracture force measured in the frozen state of frozen fruit samples is less than a specific value i.e., 0.01kN.

Fellows teaches that "slow" freezing can rupture cell walls and permanently damage the cells of the fruit. On thawing the cells do not regain their original shape and turgidity. Fellows further teaches that "fast" freezing leads to smaller ice crystals, minimal dehydration of cells and a greater extent of texture retention. Finally, Fellows teaches that "very high" freezing rates may cause stresses within "some foods" that result in splitting or cracking of the tissue.

Francis is relied upon to show that the freezing rate may be evaluated by the speed of movement of the ice through the product.

The Examiner asserted that since Yamane et al discloses cooling and freezing fruits at a particular freezing rate and since Fellows teaches that slow freezing rates causes deforming and rupture of plant's cell walls and that fast freezing causes splitting and cracking of tissue, that it would have been obvious to modify the disclosure of Yamane et al and vary the freezing rate in order to produce a frozen product that would preserve its original shape, cell structure and turgidity on thawing as taught by Fellows. The Examiner further asserted that it would have also been obvious to vary the freezing rate in order to achieve desired texture, i.e., fracture force. Applicants respectfully disagree based on the arguments set forth below.

Firstly, Yamane et al clearly state on page 5, lines 6-10 that "when the slow cooling treatment conditions and process are not employed, that is, when a slow cooling

treatment involving cooling at a gradual rate of 0.01 to 0.5° C hour to below the freezing point is not performed, it is difficult to maintain a food or the like in a non-frozen state in the temperature zone below the freezing point, and the stated objects cannot be achieved. " (emphasis added) Thus, applicants' submit that it would not have been obvious to a person of ordinary skill in the art to ever have modified Yamane et al by selecting a cooling rate higher than 0.5° C/hr (e.g., a rate of 2.5° C/hr as used in examples 4-6) because such a modification is expressly taught by Yamane et al to make the invention inoperative.

Secondly, Fellows provides no guidance whatsoever as to what is meant by the terms "slow freezing" rates, "fast freezing" or "very high freezing" rate. Applicants respectfully direct the Examiners attention to comparative examples 1-3 where fruit pieces were frozen in a blast freezer, an apparatus commonly employed for the commercial freezing of foods. The freezing rates employed in this example are typical of the fast freezing of foods commercially practiced and would certainly be expected to be encompassed by the term "fast freezing" taught by Fellows since the Fellows reference is a treatise on practical food processing technology. However, applicants' Examples 4-6 (pages 7-8) show that the textures and flavors of fruit bits in the frozen state formed by this "fast freezing" process where surprisingly inferior to the textures and flavors of frozen fruit bits produced by applicants' slower freezing process recited in claim 1.

Finally, neither Yamane et al, Fellows nor Francis teaches anything about the texture and flavor of fruits that are to be eaten in the frozen state and provides no guidance whatsoever for adjusting the freezing rate so it will be sufficiently slow (based on temperature differential between surface and core and the fracture force) to provide flavor and texture benefits, yet sufficiently fast to be practical on a commercial scale.

Applicants submit that it is only through hindsight that applicants' claimed invention could be derived from the combination of references cited by the Examiner.

Absent a disclosure of an under-cooling rate between 2 C/hr and 320 C/hr chosen such that the temperature difference between the surface and the core of fruit is less than 1.5° C and that the median fracture force measured in the frozen state of the frozen fruit samples is less than the specified value, applicants submit that the collection of references do not present a *prima facie* case of obviousness.

In light of the above amendments and remarks, applicants respectfully request that the 103(a) rejection over Yamane et al (EP 0,815,746 A1) in view of Fellows (Food Processing Technology – Principles and Practice) and Francis et al (Wiley Encyclopedia of Food Science and Technology) be reconsidered and withdrawn and that the application be allowed to issue.

If a telephone conversation would be of assistance in advancing prosecution of the subject application, applicants' undersigned agent invites the Examiner to telephone him at the number provided.

Respectfully submitted,

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